

QUANTA

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INFORMATION ON THE GROUP

Membership of QUANTA (QL Users and Tinkerers Association) is by subscription to QUANTA, the group's newsletter, which is published monthly. Membership details are obtainable from the secretary. Membership of the group is open to anyone with an interest in the Sinclair QL microcomputer.

Members requiring assistance with problems related to the QL may write to or phone the secretary. An attempt will be made to put them in touch with a member who can help with the problem.

Workshops will be arranged from time to time in various parts of the country.

The group maintains a software library. Most of the programs are free to members. A library list will be published from time to time. Programs are obtainable from the sub-librarians.

A list of members in any particular area is obtainable from the secretary.

Please send all contributions to the newsletter to the editor.

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NOTES FOR CONTRIBUTORS TO QUANTA

If possible, please send all contributions longer than half a page in machine-readable form (Microdrive cartridge or 40-track disk). Cartridges and disks will be returned ASAP. Lengthy contributions that have to be typed in will go to the bottom of the pile.

Short programs can be included, but lengthy programs should be placed in the library, and a description sent in for the newsletter.

EDITORIAL

As I write this, it looks as though Medic have gone under. At least two members stand to lose substantial sums of money. As I believe has been said several times, the safest way to order goods is on a credit card. If the value of the goods is over £100 the credit card company is liable if the vendor "goes bust". The credit card company is also liable if the company fails and the goods are faulty, I believe. We'll keep in touch with developments at Medic - please ring if you would like to know what is going on.

A lot of material that has been sent to me over the last month has had to be held over for the next issue. This is mostly material that will have to be typed in, as it wasn't submitted in machine-readable form (on cartridge or disk). If I can fill most of the newsletter with machine-readable material, I feel little inclination to spend several hours typing in stuff that has already been typed in by you, and then printed out, so that I can type it in again!

Best wishes for Christmas and the New Year from Brian and me.

Leon Heller

MEMBERS' LETTERS

I feel that I really must write and warn members of the group of recent events concerning the editorial staff of the magazine "QL World".

In July 1985 I spent a great deal of time and effort in the creation and completion of my screen compression routines for SuperBASIC. These routines were written, in the first place, in order that they would be offered as a magazine article to "QL World", as requested by them in the first issue. It was quite clearly stated that good quality programs were required for the magazine and payment would be made for such.

Having written my programs, it was my intention to have them published in "QL World" and then offer them to the group. The payment from publication would repay the majority of the costs for the work itself and a smaller amount would come in from the group members.

After the program was submitted to "QL World", I telephoned (more than once, from Helsinki and at my own expense) the programs editor to establish the position concerning publication. The result was VERY positive but I was told that space was lacking for publication and it would be held back until the October issue. When the October issue was published, and what a shocking issue it was, and the program still had not been printed, I telephoned once again. This time I was told that "NO PROGRAMS WOULD BE PUBLISHED AT ALL" and that some kind of Microdrive exchange would be set up in order to "SELL" programs with a small royalty fee being paid to the author. Remember that this was over a four month period and during that time I could not offer the article or program to another publication.

The exact system to be used will be that the author submits a program to "QL World" and if it is accepted it will be added to the list and a "screen shot" and/or a description of the program would be published. A reader may then purchase the program for £3.75 if supplying his/her own cartridge or £5.75 with the cartridge supplied by QL World. The author of the program would be paid a royalty fee of £0.50 for each copy of the program sold.

Upon hearing this and thinking about it for a while I telephoned the programs editor again and withdrew all rights to any programs written by me and demanded the return of any material sent to QL World. To be fair, the programs editor was very friendly about it and stated that my material will be returned. This mark you after a four month delay.

I would warn EVERY prospective program author to be VERY aware of what is happening here and I would suggest that members take out a subscription to "QL User" again. Come back "QL User", all is forgiven. With tactics like this in the microcomputer industry, it makes the behaviour of Sinclair Research and Medic Data Systems look positively appealing.

To those of you who have purchased my software, either via QUANTA, direct or from T:mi Softronic, I offer my thanks and inform you that more of the same will be on it's way. I am working on a "virtual" screen in which a larger "screen" may be viewed via a window on the "real" screen. I am also working a a faster SORT algorithm which also includes the "tag" SORT system but at about 2-4 times as fast as the current version with very large arrays. I also have a "paint" routine which can be used to colour any enclosed shape. The routines mentioned above still have "bugs" (=features) in them, but when they are ok, they will be submitted to the group's library.

The full "Screen compression" article will be submitted to other magazines for publication and this son-of-a-gun will NOT be taking out a subscription to "QL World". You have been warned.

Best regards to all our listeners,

V. R. Dwight, T:mi Softronic,
Suvikuja 3B14,
02120 Espoo 12,
Finland.

I had in fact started this letter a week ago but ran into trouble. The QL suddenly decided to play up on me. The 1, 2, W, Z, Caps Lock, and left cursor keys went "dead" and refused to register (Start again - Quill locked up and I lost 200 words since the last save - groan) which left me with a problem. Send the QL back to the UK at vast cost and wait months for it to come back or void the guarantee. I took the latter course in the end and stripped the keyboard down, cleaned all the dust and gunge from it and sprayed the connectors on the main PCB with contact cleaner. So far, touch wood, it seems to be OK.

Is there any chance of Sinclair making the JS ROM available separately for those who wish to upgrade their QLs? If the price is now indeed down to £199 I'll probably buy a second QL when I'm in the UK at the beginning of next year. The price of computers is diabolical out here. The QL is going for around AU\$1,100 and the AMSTRAD CPC 464 has just been released in PNG at the equivalent of £900. You have it easy in the UK!! Wolfgang Lenerz (June QUANTA) may think he has software problems in France - out here we haven't got any! Sinclair will not supply direct and as of the end of September the Pacific (in New Zealand) agents for Sinclair had PSION Chess and the Toolkit, nothing more!

The "One Per Desk" is now available out here. Marketed by Telecom Australia as "The Computerphone" the cost is AU\$3,000 for the monochrome version, AU\$4,000 for the colour version.

We have had one here for acceptance testing and I've managed to get my hands on it for a little while. The most immediate reaction is that the documentation is far better than Sinclair's original manual. The manuals are basically the same but most of the errors have been removed and the commands are far more comprehensively explained. The Psion packages (the "XCHANGE" suite) are also much better documented. The Psion packages are much faster in ROM with "Goto, Bottom" of a 15 page document almost instantaneous in execution (I'd guess that the version used by Kable Singh - page 43, June QUANTA - is an earlier version of of the Xchange ROMs). Transfer of information is also much easier with Xchange and you can freeze one package, move to another then jump back again (ie:- break from a letter, work on a spreadsheet, then jump back to the letter).

The "Computerphone" treats part of its memory as RAM disc so the)(change suite will save to left or right Microdrive (NB: not MDV1 or 2, although that convention is still used in SuperBASIC) or to memory. Also documents are saved as Name.doc and not Name doc. Have not had a chance to try to copy a document between the QL and the "Computerphone" yet but it should be possible by taking a Name doc and converting it Name in SuperBASIC then back to Name.doc in the "Computerphone" version of SuperBASIC.

The "Computerphone" does not support the full foreign character set of the QL (e.g.: - accented Spanish or French letters or Greek characters) nor does it have the graphics commands of the QL (arc,circle,etc). Main differences in the commands are as follows:-

SUPERBASIC. The following QL commands are not available:-

ARC ARC R BAUD BLOCK BORDER CIRCLE CIRCLE R CURSOR DIR
ELLIPSE ELLIPSE R EXEC EXEC W FILL FLASH FORMAT KEYROW LINE LINE
R MODE NET OVER PAN PENDOWN PENUP POINT POINT_R RECOL SCALE
SCROLL SEXEC STRIP TURN TURNT0

Mdv dir and Format operations are done from the main command menu of the "Computerphone" and not from SuperBASIC.

Some of the commands are accepted by the syntax checker so the commands are available but are unrecognised by the Operating System. The SuperBASIC incidentally is loaded from Microdrive cartridge and is not held in ROM.

The following are additional commands in the Computerphone SuperBASIC:-

“ BYE” Quits SuperBASIC and returns to the command level of the Operating System.

“CALL” Used instead of EXEC.

DEL_PSE Used to Delete entries in the "Computerphone's permanent store".

INCLUDE To add additional Keywords to Basic and/or introduce new Devices.

MISTake As per the QL but it works on the "Computerphone" which is more than can be said for my JM ROM version.

PSE\$ Returns the string value contained in a "permanent store" entry.

PUBLISH As per save but then includes the stored programme on the command level menu.

SEGMENT Allocates extra store to a BASIC programme.

SET PSE Used to add information to the "permanent store"

WIDTH On the "Computerphone" "sets the nominal page width of a Microdrive device"

The XCHANGE suite commands common to all four applications are:-

BACKUP DELETE LIST OUTPUT(Printer Spooler) QUIT RENAME (Now, that the QL needs!) SET(specifies whether the help file for the XCHANGE suite is in the left or right Microdrive) XCHANGE (For transfer of data between the packages).

Apart from the above the commands in Quill: Abacus, Archive and Easel are identical to the Sinclair QL version.

Hopefully, when I can prying the "Computerphone" away from the guy who is testing it at the moment, I can get some more time on the machine and try transferring BASIC programs and Quill documents, etc. I also want to try printing out the contents of the SuperBASIC cartridge supplied with the "Computerphone". I'll write with more information when I get the time on the machine.

Moving on, some comments on previous issues of QUANTA and some questions.

John Downie is right and wrong (page 5, August). Using Archive version 2.00, I can end up with the first record deleted and replaced with another record without using ALTER. If I add 50 or so records to a file of 600+ records using INSERT, the first record disappears (to be replaced with one of the INSERTed records). So, the fault is there despite Psion's claims to the contrary but it doesn't require the use of ALTER, INSERT will stuff the system up just as easily! To add records to a file I now use a procedure to add a number of empty records to the end of the file, SELECT the blank records, ALTER them with the new information, then RESET. It takes more time but I don't have to keep checking the first record of the file to see if I've lost it!

I also agree totally with the comments on the BACKUP problem in Archive (June QUANTA, page 14). Using a dbf of over 500 records (10 fields) I consistently get "incomplete file transfer" messages and have to go back to SuperBASIC to copy the dbf (or better still, use the Library fast-file-copier). Despite Sinclair's protestations that Version 1.00 of the Psion suite are perfectly usable there are still hassles with Version 2.00!!

Finally, my grateful thanks to Leon, Brian and all the contributors to QUANTA. Without you I'd rapidly go insane through lack of software, information and news!

Gordon Darling,
P.O. Box 3474,
Boroko,
Papua New Guinea.

The continuing Nordic saga! Mitsubishi replaced my 1/2 height drives with 1/3 height. These are slower in tracking (6 ms) using a worm screw but work reliably (so far). They actually admitted there were some problems with the other drives. They are only "on loan" so there may still be a confrontation!

Quite a few people, it seems, have problems with the Medic interface. There are drive problems, similar to mine. Others have interfaces, unboxed, which will not read flp1_ or flp2_. I had a similar problem with my first system. All I can suggest is that the ribbon connector be checked carefully, especially for a good connection in the disc drive. The cable clamp in the drive is not effective and the connector is not clamped to the drive, unlike the IDC plug on the Medic side. The 8 MHz oscillator is worth checking. The earth connection to the case is made by soldering direct to a neighbouring TTL chip!

As many members will know, Mr Skoglund of Medic has vanished, according to QL World. It sadly does look like the company is beyond Medication.

I gather there are plenty of cases, and interfaces, at Cliddesden, so maybe someone will be able to purchase these if the company is liquidated.

Tony Firshman,
43, Rhyl Street,
London NW5 3HB.

Concerning Steve Salgo's letter, and your response. I want to put some things in a better light. Steve complains about the lack of software here. That's true. But, most of the software especially business software - is written in English. That means most people are not able to use it. More importantly, even if our Swiss agent (Elcoma) tries to get hard- and software for this small market they have problems. I contacted Elcoma to ask why they don't import more soft- and hardware. When I saw their documentation (orders and telex) I could hardly believe what they showed me. But they could prove that it wasn't their fault. Some striking examples: Micro-P disk drives were ordered by Elcoma in January 1985. At the end of February they were told that Items would be delivered at the end of March. But - believe it or not it's true - it wasn't until the end of October that the first drives arrived. So, whose fault is it when there are no drives in Switzerland? Next example: Sinclair macro assembler. Until now (21/11/85) not even one has arrived. (They ordered it, as soon as Sinclair announced it.)

Last example: Elcoma wanted to adapt the keyboard to the Swiss standard. They were ready to do it on their own account. They asked Sinclair for permission. For six weeks they got no reply. Then they got the answer: "No!". With an English keyboard word-processing is nearly impossible and hard work and tedious with a German keyboard. I do word-processing with the QL - but you really need enthusiasm. For the Swiss market the Psion software is not sufficient. Most people want a working computer and not one that can be used with enthusiasm. Now Sinclair have announced that if there is to be a Swiss keyboard, they will make the necessary modifications themselves. So, hopefully, it will arrive at the end of this century. Just reckon: the German market is about 12 times bigger. The German keyboard was announced and shown in Germany at the end of 1984. The first demonstration QLs arrived here in August. The first MGG QLs were delivered in November, not because Elcoma didn't want them, but because they couldn't get them. By the way: The first MGG QLs that I saw - the demonstration QL's (to be delivered soon...) - didn't work with the Micro-P disk interface - a good argument for anyone who want's to sell other makes of computer. Now the Micro-P interface works - but other computers are sold. And the big deal before Christmas with a Swiss or even a German keyboard is: "coming soon", might be next Christmas.

To summarise: Steve is right in that he complains about lack of soft- and hardware. But in most cases - as Elcoma could prove it isn't their fault. But lack of software and hardware leads to an unattractive QL. And that leads us to a still more uninteresting market. The QL was interesting - if we could get all that's available. That would soon create a good market even for own software.

A personal comment: I know Steve, and some of his problems are due to his honesty. He refrains from software piracy.

The above-mentioned Sinclair assembler was available in July - I saw it - in a copied version! (No, not a QUANTA member:). But it is really awful if software robbery was the only way to get software in a reasonable time scale. And the later software arrives the less is sold - due to copying.

Wolfgang Göller,
Rosenstr. 21,
CH 8105 Regensdorf,
Switzerland.

Re: Printing the final line of a Quill (2.00) document. I use a Canon PW1080A and I can print the last line by pressing the ON LINE button, that is, turning the printer OFF LINE. Pressing FORM FEED and ON LINE again leaves the machine ready for the next document.

C. M. Glover,
15, Hythe House,
Swan Road,
London SE16.

I was very pleased to receive detailed information regarding the problem I encountered in trying to connect a Juki 6100 printer to my QL. In particular, two members of QUANTA, Phillip Biggs and John Gartshore, gave me a complete solution to my problem.

Bernard Dalens,
9 Chemin de Villard,
63670 Gergovie,
France.

PROBLEM SECTION

I have met with a few problems, perhaps other members can help me with some of these.

1. I have been using Richard Cross's routine to define the function keys to put predetermined strings into the keyboard buffer while writing BASIC programs (QL User May 85) and it works well until I get about 100 lines typed in, or if I load a program of similar or greater length. The machine then freezes as solidly as if I had pressed CTRL,ALT,7. I think the key scanning interferes with QDOS when it tries to reorganise the "free" memory to give more to BASIC. I write my programs in short chunks and MERGE them later to get over this, but it would be nice to have a similar routine which gets along better with QDOS. (I have not got to 68000 assembler yet myself!).

2. The clock program from page 42 of the concepts section now Works, but once it is running it is impossible to RESPR any more memory. So if I am putting in more than one machine Code routine clock" has to go in last.

3. According to the manual, Archive fields can hold 255 characters, but a line will only hold 80 or so. I cannot find any way of displaying more than one line for each field. Is there any way of displaying all 255 characters ?

Howard J. Clase,
c/o Chemistry Department,
Memorial University,
St. John's,
Newfoundland,
Canada, A113 3X7.

/* The standard Archive 2.0 input procedure won't accept more than a line of input. To input and display fields longer than this you have to write your own procedures. The following procedures should give some idea as to what is required:-

```
proc getrec
input names
append
Endproc
```

```
proc stat
let name$="x"
while name$<>""
Getrec
Endwhile
Endproc
```

As a rule, you shouldn't need long strings, unless you are storing text. LFH */

FASTER SORTING

The subject for this time is sorting. My sort program is "at last" ready and I think all the bugs are out. The algorithm used is the "quicksort" algorithm from the "squicksort" by Mr. Hoare. The actual code in the routine was inspired by an article in "COMPUTE!'s GAZETTE" and is written to reduce the amount of recursion required. This in turn reduces the amount of stack space required as well as the amount of time. This routine is about 100% faster than my previous "SHELL" sort routine and is very much faster for very large arrays. I have sorted a random integer array of 294,309 Integer (DIM N%(8,32700) items in 4 minutes and 24 seconds using this routine. This drops to 3 minutes and 6 seconds on a re-sort which I think is fairly respectable for a "so-called" but-not-by-me, 8-bit machine.

The documentation supplied should be quite enough for most people to get the hang of how to use the routine but if enough requests are received I will write a short "article" for QUANTA. The main advantage of this type of routine is the ability to perform a "tag" sort which allows data in more than one array to be sorted and/or allows an array to contain data which is not a part of the sort "domain". An example would be a floating point array which contained 5 numbers pertaining to each entry. A normal sort would re-arrange the entire array and you would lose the grouping of numbers. Using a "tag" sort, it is quite easy to sort only on the first, second or whatever element within the group and NOT to lose the original data sequence. Another use would be to sort multiple arrays using the data in one of the arrays as a "key".

If the program is satisfactory I would like it placed in the QUANTA library with a one pound royalty fee (my wife still needs the money).

The program also contains two more useful PROCedures to allow the user to enable and disable the "break" key from within a SuperBASIC program. My thanks to Tony Tebby for the information required to make those routines work.

Ron Dwight,
T:mi Softronic,
Suvikuja 3B14,
02120 Espoo 12,
Finland.

THE AMERICAN QL,

A year or so ago I packed away my trusty ZX81 (alias TS1000) and set off for a year's sabbatical leave at the University of Reading. During this time I became familiar with the Acorn-BBC, both as a micro and as a main frame terminal, and was also lent a "JM" QL for several weeks. I decided that I wanted a QL for myself when I returned, and that I'd try to persuade the University to buy me a BBC to use as a terminal, since there doesn't seem to be comparable terminal software for the QL yet, although no doubt there will be soon.

My "JSU" North American issue QL arrived two months ago and a "Beeb" is expected shortly. I thought your readers might be interested to hear about the way Sir Clive is supplying the North American market with QLs. Despite fairly good reviews in "Creative Computing" in the U.S.A. and "Computing Now!" here in Canada the QL, seems to be only available by mail order, but since this is true of most good things here in St. John's that doesn't bother me much. However as far as I know mine is the only QL for hundreds of kilometres, so QUANTA and QL-User are my main contacts with the QL world.

Externally the JSU QL only differs from the UK version in the two RS232 ports which are 9 pin D type sockets instead of the BT jacks which are not available here, and possibly in the joystick ports which are D type plugs. This logic did not extend to the monitor output however since 8 pin DIN pins aren't readily available here either, and none is supplied with the machine. Fortunately I had had the foresight to bring a couple with me. The Canadian distributor was asking \$6.95 (£5) each for them! After some experimentation we found that the pin numbers on the RS232 ports are exactly the same as in the UK manual, even though the socket is quite different.

The next problem was the display. The TV output like that of the ZX81 is VHF and also just like the ZX81 gives a rather poor display due to RF interference. In fact on my old B&W TV the ZX81 is better! (I suppose there must be some reason why UHF is not used here.) Taking advantage of the QL's portability I carried it around the University peering into offices looking for colleagues working at personal computers. Thus I was able to try out half a dozen or so different monitors. Surprisingly all of them were able to cope with the 85 character display, but several, especially the cheaper models, flickered unpleasantly. The flicker problem seems to be to do with the transatlantic 50/60 Hz difference since it is also present with the Beeb and disappears in NTSC TV mode on the QL, but that partly defeats the point of having a monitor since part of the screen disappears as well! I eventually settled on an Amdek 300A (amber monochrome) which has a long persistence phosphor and is virtually flicker free, sharp, and displays 8 distinct Shades in mode 8. It was a bit more expensive of course, but well worth it for the quality of the picture. Colour monitors seem to be considerably more expensive here than in the UK but I wasn't looking for one of those anyway.

As far as the software is concerned, the labels are different. They are rather prosaically called "Word Processor", "Database", "Spreadsheet", and "Business Graphics", they display "QL-WP 2.10" etc. while loading but once they start running then we are back to the familiar "Quill", "Archive" etc - familiar to me but it must be confusing to someone with no UK connections. To add to the confusion the manual is the standard UK issue (the 12/84 edition with indexes and a clock programme that works!) plus a few duplicated sheets. However there are minor changes when in TV mode to allow for the poorer resolution of our TV screens (525 lines). When I load a copy of Quill (UK 2.0) that I brought back with me the status lines disappear off the bottom of the screen in TV mode but it seems identical in monitor mode. Otherwise it works, and all my UK docs and BASIC programs have behaved perfectly.

Although I sent my QLUB registration in two months ago, and asked for information on obtaining more cartridges and other peripherals, I have as yet had no reply. I have however had a reply by return from a US supplier who seems to have more entrepreneurial spirit. His prices seem comparable with UK ones but there is again the customs problem. I wonder how people without UK connections manage. My Canadian QL seems able to find more good sectors on each cartridge than the UK one. I get an average of about 230 good sectors instead of 220 on the same set of tapes.

I am not aware of any price reduction here yet corresponding to the recent halving of the UK price.

There is also one experience that might be useful if it has not been reported before. Before I left England I obtained a number of programs from QL User on cartridge, and carefully copied them onto a second cartridge as soon as I got it. However when I tried to load the longest one (a BASIC assembler - 120 sectors) into my own QL neither copy would load properly. I found that each broke down at a different point by using a screen dump program, but that didn't help. As a last resort I tried COPYing onto another cartridge, and was surprised to find that the copy did load. I then split the program into four sections and made second copies of these. A short BASIC program of MERGE statements re-assembles the assembler as quickly as it would take to load the whole thing (or do I mean as slowly ?). Even if both copies do fail again the chances are that the faults will not be in the same sections.

Finally what happened to the ZX81? I found it a good home with a Russian engineer and his daughter who recently "emigrated" to Canada when their plane refuelled at Gander. They think it's a marvel, which indeed it is!

Howard J. Clase,
c/o Chemistry Department,
Memorial University,
St. John's,
Newfoundland,
Canada, A1B 3X7.

FAST DISK BACKUP

Members may be interested in the following program which was written to speed up the process of making a "backup" copy of a 5.25" or 3.5" diskette. The program will copy the entire contents of FLP1 to FLP2 in about three minutes for a single sided (320Kb) diskette and just under four and a half minutes for a double sided (720Kb) diskette.

Please be aware that diskettes which contain bad sectors cannot be used as destination diskettes in FLP2. If a diskette with bad sectors is used in FLP1, i.e. copied FROM, the only result will be that errors are reported by the program which may be recovered with "RETRY" or ignored with "CONTINUE".

This program will only operate with a diskette interface with firmware release 1.7 or greater. If the program is suitable, please place it in the library for free distribution to members.

```
100 REMark Diskette unit fast backup program using Tony Tebby
110 REMark diskette firmware release 1.7 or later.
120 REMark
130 REMark My thanks to David Oliver of CST for information
140 REMark enabling this program to be written.
150 REMark
160 MODE 4 : CLEAR
170 REMark
180 REMark Explanation of OPEN command:-
190 REMark
200 REMark General format is OPEN #ch , "FLPx_*dyz"
210 REMark
220 REMark x = drive number 3 = INPUT, 4 = OUTPUT
230 REMark d = always d for some reason not explained
240 REMark y = 0 .. 128 byte sectors
250 REMark 1 ..256 byte sectors
260 REMark 2 ..512 byte sectors
270 REMark 3 ..1024 bytes sectors
280 REMark z = s .. single density
290 REMark d .. double density
300 REMark
310 REMark This information is a repeat of information given
320 REMark earlier by Leon Heller in the May 1985 issue of
325 REMark QUANTA.
330 REMark
340 OPEN #3 , "flp1_*d2d"
350 OPEN #4 , "flp2_*d2d"
360 REMark
370 REMark Alter the following parameters to suit your own
380 REMark diskette configuration
390 REMark
400 REMark TRACKS = The maximum number of tracks on your units
405 REMark (40/80)
410 REMark
420 REMark SIDES = 1 for single sided or 2 for a double sided
430 REMark
440 tracks = 80
450 sides = 2
460 REMark
470 FOR track = 0 TO tracks - 1
480     x = 65536 * track
490     getrack
```

```
500 putrack
510 NEXT track
520 CLOSE #3
530 CLOSE #4
540 PRINT "Diskette contents copied" : STOP
550 REMark
560 REMark The following PROCedures are responsible for
570 REMark reading and writing a complete track of 9 sectors
575 REMark at a time. The method used is intended to reduce
580 REMark the time required to as small a value as possible
590 REMark within a SuperBASIC program. This would mean
600 REMark that if a diskette was more than 50% full it would
610 REMark be faster to copy the entire contents a track at a
620 REMark time rather than copy only the data files, a file
625 REMark at a time.
630 REMark
640 REMark
650 REMark Timings for complete disc copy
660 REMark
670 REMark TEAC 55F 5.25" DSDD 80tr = 720Kb 4 mins 17 secs
680 REMark
690 REMark Mitsubishi 3.5" DSDD 80tr = 720Kb 4 mins 15 secs
700 REMark
710 REMark
720 REMark If you are lucky enough to own a 'JS' ROM or later,
730 REMark you should add error detection to the program and
735 REMark recover from read/write errors. For those with
740 REMark earlier versions I suggest typing the command
750 REMark "RETRY" immediately following the "RUN" command.
760 REMark
770 REMark
780 DEFine PROCedure getrack
790 GET #3\x+1,a$ : GET #3\x+4,b$ : GET #3\x+7,c$
795 GET #3\x+2,d$ : GET #3\x+5,e$ : GET #3\x+8,f$
797 GET #3\x+3,g$ : GET #3\x+6,h$ : GET #3\x+9,i$
800 IF sides = 2 THEN
810 GET #3\x+257,j$ : GET #3\x+260,k$ : GET #3\x+263,l$
812 GET #3\x+258,m$ : GET #3\x+261,n$ : GET #3\x+264,o$
814 GET #3\x+259,p$ : GET #3\x+262,q$ : GET #3\x+265,r$
820 END IF
830 END DEFine getrack
840 DEFine PROCedure putrack
850 PUT #4\x+1,a$ : PUT #4\x+4,b$ : PUT #4\x+7,c$
853 PUT #4\x+2,d$ : PUT #4\x+5,e$ : PUT #4\x+8,f$
854 PUT #4\x+3,g$ : PUT #4\x+6,h$ : PUT #4\x+9,i$
860 PUT #4\x+4,b$
870 IF sides = 2 THEN
880 PUT #4\x+257,j$ : PUT #4\x+260,k$ : PUT #4\x+263,l$
882 PUT #4\x+258,m$ : PUT #4\x+261,n$ : PUT #4\x+264,o$
884 PUT #4\x+259,p$ : PUT #4\x+262,q$ : PUT #4\x+265,r$
```

```
886     END IF
900 END DEFine putrack
```

Ron Dwight,
Suvikuja 3B14,
02120 Espoo 12,
Finland.

PSION 2.3 SOFTWARE AND THE NETWORK

Ron Humphries and I have now succeeded in using the network with version 2.3 of the Psion software at a local QUANTA meeting in Birmingham. It proved possible on a brief experiment to export the GAZET_DBF from Archive into Quill. Both QLs were D15 series with JS ROMs. The method used the commands detailed on page 11 of the introduction section of the User Guide in the 12/84 edition.

Two main problems were encountered.

The first was that no communication appeared to take place using broadcasting (neto_0). I have subsequently found out that this is a QDOS/QL fault rather than Psion not implementing it. Presumably we will have to wait for another QL ROM update to implement this. By naming the QLs net14 and net2 and exporting and importing incorporating these net numbers communications were established.

The second was with the new (version 2.3) Quill import facility to import by line or paragraph. The receiving QL came up with an "out of memory" error after a while on importing by paragraph whereas importing by line, Quill made its usual request to put a Microdrive into mdv2 to set up a temporary file when the memory was full. Further tests will have to wait until a later date but I do not think it will be possible to implement a file server easily using one QL running disks and memory and others accessing it within the Archive program which is what I was hoping for.

Commands used:

```
QL(net1) running QUILL : import,_neti2
QL(net2) running ARCHIVE : export "_neto_1" quill
```

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Selly Oak,
Birmingham B29 6QE.
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ICE

I haven't written to QUANTA before, mainly because I have been overawed by the erudition of your regular contributors and partly because I have had nothing to say.

However, Mike Dadswell's review of ICE in the November issue prompts me to try a few words. I too have had ICE for two or three weeks now and have found it to be of great value ...and a d**d nuisance at times. Initially I attached it to my QL at work which I mostly use for Quill, a typographic utility I have developed and for Archive. Loading software with ICE in position one must first press F1, wait for mdv1_ to stop, then cursor the arrow to the correct icon and click for a directory. Following this a move is made to the Boot icon, now showing with others on screen and finally the program loads.

At first this is all enormous fun and impresses the hell out of passers-by, but after the twentieth time it becomes rather a pain.

As a consequence I have moved ICE to my home QL, and I can now really get on top of my "housekeeping" duties. As a graphic designer I can really appreciate that a neat display of 12 carefully differentiated images as a directory (followed by as many more 12 item pages as are necessary) is much clearer to the mind than dense columns of abbreviated names.

What is really excellent is the ability to "View" the contents of any file in seconds, thus gaining an impression of what a forgotten file-name is all about.

The calculator is a waste of time. The effort of getting the cursor arrow correctly placed over each digit at any sort of speed at all makes the whole exercise quite pointless. The calendar could be quite useful but this means setting the date each time the machine is switched on. (Why doesn't someone devise a small battery driven clock that automatically sets the date on switch-on?)

I have fiddled with the multi-tasking "Choice" module but as the manual still hasn't arrived this will have to await more time and a greater need.

Now that I have the measure of ICE and know what the limitations are for me I would praise it most highly as a very handy "tool", but retain doubts about its use in a busy environment

To change the subject: I am flabbergasted by Medic: They seem to have, on paper, a wonderful system but their advertising appears unrelated to any sense of economics. I see, in this month's QL World that they are offering their interface with 512K on board, 720K disc drive, 5MB Winchester, cables, suite of software for £449.95. This seems to be astonishingly good value but as I read it you will also be able to claim a FREE green-screen monitor at some later date) Is it possible? Is it believable?

I sent off my three cartridges and £2.50 to Medic for free games about two months ago, since which time absolute silence has reigned. Has anyone else done any better?

This has been printed out on my Canon PW1080A, a machine that I would recommend (as I have two, both at a fine discount from Printerland). Thanks to the tips in QUANTA I am now able to call both NLQ mode and this sans serif face, resident as a spare ROM, directly from Quill.

I shall come to an end now with a few words of praise for all concerned in the organisation of QUANTA. The amount of pleasure, instruction, and good solid knowledge that I have gleaned from QUANTA far outweighs the tiny sum the subs cost. Many thanks indeed to all of you who work so hard to bring us our monthly treat and long may you keep it up.

Following this praise I suppose that I should offer my own services if they can be used. I am a freelance commercial artist by trade and if the magazine needs any (not too time consuming), design work done then please, Leon, get in touch and I'll do what I can.

John Jarratt,
4, Honeycroft,
Welwyn Garden City,
Herts. AL8 6HR.

ICE - A FURTHER VIEW

I read Mike Dadswell's review of this with interest having had the ROM cartridge for several days when the latest QUANTA (Vol. 2.10) arrived.

I use a QL with 256k extra memory and disk I/F with Simplex's Q+2 board and have really appreciated ICE. The three others in the local QUANTA group that I know have ICE all have extra memory and disks and it is to this group of people with expanded QLS that it will appeal.

For instance, when Mr. Dadswell has his memory expansion and is multi-tasking the PSION programs he will find that with a couple of key presses he can access the calendar and with two more key presses return to his program where he left off.

I received a couple of tips from Eidersoft. They gave me this information "to make it worth my while" ringing them with a supposed bug I had found which was not a bug but merely my own stupidity: I ignored the screen directions as I thought I knew better. Both of these are probably of more use to disk users whose directories tend to go on for many pages. The first is that the copy facility copies the files in the order that you have chosen them from the directory, even skipping about through the pages of the directory. Using this you can make a clean disk with the most used files on the front page. I, for instance, have on the front page of my Psion disk my multi-tasking programs and single Quill, Archive, Abacus and Easel programs. The

second tip is to fill a page with programs of the same type when setting up a disk. For instance if you want a page of Quill type _doc files save 12 empty programs ending _doc something like a SuperBASIC program "10 REMark empty" and name them dummy1_doc, dummy2_doc etc. Before you save a document, if you delete one of these then your real document will be inserted in its place on that page of the directory. Of course this is only echoing what is happening in the standard directory map anyway, but with the paged directory system it is quite useful.

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Selly Oak,
Birmingham B29 6QE.
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REVIEW OF CUMANA DISK INTERFACE AND DRIVES

The package I am using for this review consists of an "Insider" disk interface and two 80 track double-sided 3 1/2" drives. The disk interface comes with firmware 1.14 in EPROM. It came as no surprise to me that the firmware was written by QJUMP (Tony Tebby) and has 34 extras commands.

The toolkit commands can be initialised by using the command FLP_EXT then NEW. One of the most useful commands is FLP_USE: this redirects the Microdrive I/O to the disk drive so that programs written for Microdrives do not have to be modified. WCOPY can be used to copy a Microdrive file(s) to disk (also disk to disk and mdv to mdv) you get the options Y,N,Q,A. Y = copy this file, N = do not copy, Q = quit and A = copy this and all the next matching files. If the file already exists it will overwrite on confirmation. The default directories can be set with the command DATA USE. SPL is also included (resident spooler) as is CLOCK (resident clock). FLP_OPT allows you to specify the number of tracks to be formatted on a disk and the software also allows reading sectors of a disk using direct addressing: FLP1_*Dsd where s = sector length (128 bytes to 1024 bytes) and d = density. Here is a list of the other goodies available:-

JOBS, AJOB, RJOB, SPJOB, GET, BGET, PUT, RENAME, TRUNCATE, STAT, WSTAT, WDIR, WDEL, WDEL_F, VIEW, CLOCK, SPL USE, EXTRAS, FPOS, FLEN, FTYP, FDAT, FOPEN, FOP_IN, FOP_NEW, FOP_OVER, FOP_DIR.

One irritating point (shared with all the disk interfaces that I have seen so far) is that on power up FLP_ is searched for a diskette before pressing FI/F2.

The documentation is very good (41 pages) and can be understood by the first time user. The only (very small) point is that the drives are marked DRIVE 0 and DRIVE 1 where drive 0 = FLP1_ and drive 1 = FLP2_.

At £279.95 retail price for the complete system it must be the cheapest around yet it does not compromise quality.

The QL is selling very well here and there is much interest in QUANTA. We have a second distributor of Sinclair goods who will give discounts to QUANTA members (Micro Connection in Antwerp). How much has not yet been decided.

If anyone in Belgium is interested in meeting other QUANTA members please call.

Ian Johnson,
Kleinemolenweg 233,
2090 Stabroek,
Belgium.
Tel: 03/568.99.68

COMPARING STRINGS IN BCPL

The following may be of interest

There are two programs, one in BCPL to demonstrate the second which is in Assembler. The second is to replace the result := COMPSTRING(str1, str2) function in BCPL which lexically compares two strings ... result = 0 means equality -1 = str1 < str2, +1 = str2 > str1, ignoring case, type 1.

The source and object files are for the Library as is this letter, with the exec demonstration file "compstr_exec".

The new compstr function has three parameters, str1 and str2 as before, the third being the type of comparison.

0 compares strings by character, 1 just as 0 but upper and lower case are ignored, 2 compares by imbedded numbers, 3 just as 2 but ignoring case.

```
result := COMPSTRING( str1, str2, type )
```

The vector lengths do not matter greatly (but should be long enough:), as the overwritten byte will be restored.

Theoretically, if you were using a vector obtained by GETVEC ... and ... the string filled the vector ... and ... the job was interrupted whilst the string was in its expanded state ... then to another job ... and ... thus be required during scheduling there will be a problem ... but ... by using VEC to obtain a vector, the vector is on the BCPL stack and so quite safe as are local embedded strings, eg "BCPL_rules".

Perhaps others have similar routines which might extend the versatility of the Metacomco languages by linking on new extensions.

Could the routine be linked to 'C' programs?

Use BLINK to link compstr_bin and compstr_code into compstr_exec.

```
/* compstr_bcp1          BCPL source to demonstrate QDOS UT.CSTR
   9/11/85 DNY           which replaces BCPL "COMPSTRING" function
                        Compiled to compstr_bin
                        Need to "BLINK" compstr_code
   ie "BLINK": fdk1_compstr_bin, fdk1_compstr_code
   save as eg: fdk1_compstr_exec
*/

section "compstr"          // name

Manifest $(max.len = 256 $) // 255 bytes allowed in BCPL$ If

get "fdk1_libhdr"

let start() be
$(

Let vec1 = vec max.len / 4 // for 1st string, a safe 260 bytes
Let vec2 = vec max.len / 4 // for 2nd string
let type = ?              // of comparison, range 0 to 3

$(
writes("string1 :")
make.str(vec1, max.len) // enter up to 256 bytes INCL If

writes("string2 :")
make.str(vec2, max.len)

writes("type, £ 0-3 :") // see manual for meaning of number
screen(screen.cursor) // for inkey else no CTRL-C
type := inkey(- 1) repeat until ("0" <= type <= "3")
wrch(type)

writef("N%S is less than the other ..N*N",
      valof switchon compstring (vec1, vec2, type - "0") into
      $(
      case - 1 : resultis "STRING1"
      case +1 : resultis "STRING2"
      case 0 : resultis "NEITHER"
      $ )
)
$) repeat // forever
$)

and make.str(vect, num.chars) be // construct BCPL
string
$( // "bare bones"
let len = (readline(vect, num.chars) - 1) // knock off
linefeed
for i = len to 1 by - 1 vect % i := vect % (i - 1)
vect % 0 := len
$)
```

```

* compstr_asm      9/11/85
* QDOS REPLACEMENT OF BCPL          "COMPSTRING", DNY
*
*      result := compstring(str1, str2, type)
*
*      136 bytes
*      D1=BCPL   ADDR 1ST$,   D2=BCPL   ADDR  2ND$,
*      D3=TYPE OF COMPARISON
*
MODS   DC.L      (MODE-MODS)/4   LEN MODULE = (MODEND-MODSTART)/4
      CNOP      0,4             ALIGN LONG WORD FOR
COMPSTR MOVEM.L  A0-AI , - (SP)   START OF FN, SAVE REGS ON STACK
      MOVE.B    D3,D0           TYPE OF COMPARISON, QDOS USES
BYTE
*
      ASL.L     #2,D1           BCPL ADDR 1ST$ > MC ADDR
      MOVEA.L   D1,A0           ABS ADDR
      CLR.L     D1              ZERO PTR TO OVERWRITTEN CHAR
      MOVE.B    (A0),D1         LENS$
      MOVE.L    D1,D3           D3 LOOP COUNTER, LOOPS LENS$ + 1
                                TIMES
      MOVE.B    1(A0,D1.W),D4   SAVE OVERWRITTEN CHAR
LOOP1  MOVE.B    0(A0,D3.W),1(A0,D3.W) SHUFFLEUP, INDIRECT WITH
                                INDEX
      DBRA     D3,LOOP1         UNTIL D3 = -1, SO INCLUDES LENS$
      CLR.B    (A0)            ZERO HIGH BYTE LENS$
*
      ASL.L     #2,D2           SAME AGAIN SAM FOR 2ND$
      MOVEA.L   D2,A1
      CLR.L     D2
      MOVE.B    (A1),D2
      MOVE.L    D2,D3
      MOVE.B    1(A1,D2.W),D5
LOOP2  MOVE.B    0(AI ,D3.W),1(AI ,D3.W)
      DBRA     D3,LOOP2
      CLR.B    (A1)
*
      SUBA.L    A6,A0           A0 > 1ST$, A1 > 2ND$, BUT
      SUBA.L    A6,A1           FOR QDOS MAKE A6 RELATIVE
*
      SUBA.L    A3,A3           ZERO IT, DON'T USE A2: GLOB PTR
      MOVE.W    $E6,A3         UT.CSTR, NOW COMPARE STRINGS
      JSR      (A3)            DO IT, RETURNS "VALUE" IN D0
*
      ADDA.L    A6,A0           RESTORE ABS ADDR
      ADDA.L    A6,A1           A0 > 1ST$, A1 > 2ND$
*
      MOVEA.L   A0,A3           LOOP POINTER
      MOVE.L    D1,D3           SET LOOP CTR, & SHUFFLE DOWN
                                USING
LOOP3  MOVE.B    1(A3),(A3)+     INDIRECT + DISPL & POST-INCREMENT
      DBRA     D3,LOOP3         LOOPS D3 + 1 TIMES TO INCL LENS$
      MOVE.B    D4,1(A0,D1.W)   PUT BACK OVERWRITTEN CHAR

```

```
*
      MOVEA.L   A1,A3           SAME FOR 2ND$
      MOVE.L    D2,D3
LOOP4  MOVE.B   1(A3),(A3)+
      DBRA     D3,LOOP4
      MOVE.B   D5,1(A1,D2.W)
*
      MOVE.L    D0,D1           RETURN "VALUE" TO BCPL
      MOVEM.L  (SP)+,A0-A1      RESTORE REGS
      JMP      (A6)             AND HOME
*
      CNOP     0,4              FOR
      DC.L     0                END OF GLOBAL LIST
      DC.L     77,(COMPSTR-MODS) GLOBAL NUM (COMPSTRING),OFFSET
      DC.L     100              DUMMY HIGHEST GLOBAL REFERENCED
MODE  END
```

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DIY 512K RAM UPGRADE

I am in the process of upgrading my QL to 512K RAM by removing the 64K devices and replacing them with 256K chips. The upgrade will be described in two parts. In this issue I'll describe how to disassemble the unit, remove the old chips, insert the new ones, wired as 64K devices, and put the unit together again. It should then function normally. In the next issue, assuming I've worked out how to do it, I'll cover the other changes needed to finish the upgrade. This first stage should take around four hours, although I wouldn't advise doing it in one session. Doing the upgrade in two stages like this should minimise the chances of anything going drastically wrong. The RAMs are soldered in, and quite difficult to remove. Unless you have a lot of experience with electronic construction and modification, don't attempt this modification, you might not get your QL working again! Neither I nor QUANTA accept any responsibility for these modifications - you do them entirely at your own risk.

1. Disassembly

Turn the QL upside down and remove the four screws along the back of the unit, and the four screws along the front, securing the two halves together. Holding the two halves together, turn the unit over, raise the keyboard carefully, and unplug the two keyboard membrane ribbon cables. Note the positions of the six LED leads and remove them from the connector next to the UHF modulator by carefully pulling upwards on the body of the connector. The upper half of the unit can now be removed. Remove the heatsink behind the Microdrives. Remove the three screws securing each Microdrive to the lower case, lift each Microdrive in turn and carefully free their ribbon cables from the sockets on the circuit board. Place the Microdrives to one side. Release

Release the loudspeaker leads from the connector on the circuit board by carefully pulling the body of the connector upwards. Remove the reset button and the extension Microdrive bung. Remove the two screws securing the circuit board, and carefully remove the circuit board from the lower case by raising the expansion connector end and wiggling it free of the locating dowels.

2. Changing the RAMs

Remove each of the 4164 64K RAMs (IC1 - IC16) in turn, and replace it by a 41256 256K chip (150nS). The best way to remove the old chips is probably to cut through all the pins with a pair of side cutters (you will need a good quality pair of cutters, such as those made by Lindstrom), remove the chip, and carefully pull out the pins one at a time, using a soldering iron and a pair of needle-nose pliers, or tweezers. Clear all the holes, using a soldering iron and solder sucker, and very carefully inspect the board for solder splashes. A watchmaker's eyeglass would be useful. Solder in the new chip (if you use sockets, make sure they are good quality ones, as cheap sockets can cause endless problems), and connect pin 1 to pin 10 with a short piece of insulated wire (wire-wrap wire is suitable). This makes the new chip look like a 64K device. It would be wise to replace the chips one at a time, checking that the machine works each time by plugging in the power supply and monitor. You should see the usual power-on sequence, with the screen filling with a random pattern, then clearing and displaying the copyright message and F1/F2 message. If this occurs the RAM is working. Remember to unplug the power supply and monitor before going on to the next chip. If the machine doesn't power up correctly, the most likely cause is a pin left unsoldered, or a solder splash shorting some of the PCB tracks. Doing it this way, one chip at a time, it shouldn't be too difficult to find the problem.

3. Reassembly

Reverse the disassembly instructions. Note that Microdrive 1 has a shield over the controller chip, and a small piece of Insulating material between the shield and the main circuit board, to prevent shorting, and another piece between the shield and Microdrive circuit board.

The machine should function exactly as normal. If it doesn't, hard cheese! By the next issue I should have sorted out the other mods. needed to make the whole 512K available. If any member has done this, please get in touch.

Suitable chips are available from:-

D. Edmunds and Co.,
94, Stratford Road,
Wolverton,
Milton Keynes MK12 5LU.
Tel: (0908) 314925

for £2.99 each (plus £1 P and P and 15% VAT).

Leon Heller

SUPERBASIC AND STANDARDS

As a QL user, I have read a lot about the QL and I would like to make some observations.

The speed problem is due to dynamic relocation of the SuperBASIC workspace, which doesn't make use of the faster addressing modes, (+(An) or (AN)-). Of course, this eases memory management and increases the buffering space for slow peripherals, increasing the speed of I/O. Another limitation is the use of floating point for graphics: this guarantees compatibility with the 68020, and eases the programming, but slows the graphics.

SuperBASIC is good, because it is an implementation of Standard BASIC, but is not complete, and with minor differences.

Of course, Standard BASIC isn't the ridiculous pseudo-standard, but the ANSI-85 standard. Developed by ANSI X3 and the European Computers Manufacturers Association. By the way, Sinclair, Computer One, Metacomco? How long before we get a complete ANSI-85 BASIC?

ANSI Standard BASIC has been presented in various drafts, the first in 1982 for comment and information. How many computer magazines have informed their readers. How many magazines consider conformity with BASIC-85 when reviewing machines?

In Popular Computing, Nov. 1984, American experts say: "The ANSI standard BASIC exceeds the power of an 8-bit processor". I would add: for implementing ANSI BASIC, a multi-tasking OS is needed.

There are, of course, a lot of other standards, such as ISO Graphics, ANSI COBOL and more.

After reading about "the disastrous limitations of Microdrives", are ICL and British Telecom engineers incompetent? They are using Microdrives in their own equipment. I have also read "The ridiculous myth of the QL working in business". Of course, I believe: "the really ridiculous myth is the competence of the writers". I'm generous, I only doubt their competence. But how will they indemnify Sinclair and their customers?

Of course, there are serious and competent computer magazines, but how much longer must we tolerate this situation?

Jose-M. Guzman,
Ramon y Cajal 51,
41005, Sevilla,
Spain.

/* I substantially rewrote Sr. Guzman's letter, in correcting his English. I hope I've managed to say what he intended. LFH */

EVALUATING A FUNCTION

The following SuperBASIC program illustrates a method of evaluating a function as requested by James Cunningham (October page 12). As an example try $50 \cdot \sin(x/10) + 50$.

```
100 CLS
110 INPUT "function ";f$
120 OPEN NEW #4,mdv1_work
130 PRINT #4, "190 y=w;f$"
140 CLOSE #4
150 MERGE mdv1_work
160 DELETE mdv1_work
170 CLS
180 FOR x=0 TO 165 STEP .1
190   REMark This line is replaced
200   IF x=0:POINT x,y
210   LINE TO x,y
220 END FOR x
```

The Microdrive accesses can be avoided if the pipe device driver available from the library has been loaded. In that case delete line 160 and replace "mdv1_work" in lines 120 and 150 by "pipe1".

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Berks. SL4 5SE.

COMMENTS ON PIRACY

After reading Leon's position on software piracy, I agree with him. In my country we don't have complete copyright protection, but software protection has been improved.

Spain was a paradise for organized software piracy, but action has been taken, and some pirates have been imprisoned, waiting for trial.

I think this is a good thing, because this will encourage distributors, software maintenance and national software production.

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Spain.

LIBRARY CORNER.

Christmas will soon be with us and many members will no doubt be using their QL to entertain the family. The library contains many programs suitable for this ranging from the Brian Torode children's orientated package on library 9 to Phillip Murphy's arcade style games. Tom Bladon's "Worm Adventure" now extends over three cartridges for the graphics version (after being compressed) and even the non-graphics version is superior to the text adventure programs I have seen offered commercially. If you are sending for this program you will need to ensure that at least one cartridge will format to 220 free sectors and the other two should be a minimum of 216.

There are now 27 program cartridges in the library including the two library guides detailing the contents of each cartridge released to the sub-librarians up to October. They can be obtained by sending two formatted cartridges (one must format to at least 218 free sectors) and £3.00 plus a stamped addressed Jiffy bag to your sub-librarian or if you require cartridges to be supplied send £7.00 (includes postage and packing) direct to myself. Cheques should be made out to IQLUG, not to QUANTA. Librarians cannot accept requests to charge credit cards or payment in stamps for library programs: Requests for updates should be made to the sub-librarian who supplied the original program. Providing the original cartridge is returned for updating there will be no charge for this but you should still enclose a stamped addressed Jiffy bag for return.

Many members will have obtained their programs from Dennis Croombs and I have received many complimentary comments on the service he has provided in the past. Dennis is now off "Down Under" so his services will no longer be available to members in this country, but we are not letting a good librarian get away from us. I am hoping to persuade Dennis to be our representative in Australia. I am sure members will wish to join me in thanking him for the help he has given in the past and wish him every success in his new venture.

The nearest sub-librarian to Dennis is:-

Stephen Hewitt,
Portsdown Vicarage,
Portsdown Hill Road,
Portsmouth, P06 1BE
Tel: (0705) 375360

the updated version of the fast load program is now available from your sub-librarian on library 19 which also contains a file encryption program, a very useful telephone cost calculation program, utilities, and the "Stuntman" game. The last item needs to be run from mdv2 with the "Sprite Byt" file in mdv1.

The number of programs submitted for inclusion in the library has declined recently. If you have a program you feel could be useful to other members please send it on to:-

Brian Davies,
72. Wharncliffe Street,

Hull HU5 3LY.
Tel: (0482 43700

who will be pleased to advise you.

Syd Day,
241, Highfield Road,
Romford, RM5 3AW.
(Tel. 0708 27272)

REVIEW OF THE PCML 256K RAM EXPANSION WITH ROM UTILITIES

I ordered the PCML memory expansion by telephone and it arrived three days later by recorded delivery. This makes a refreshing change in these days of companies advertising goods that they cannot supply. The price is £89.50 and for this you get a card which fits inside the QL's expansion port with 256K of memory and a built in EPROM with 27 extra commands including the commands for setting up RAM Disks in memory.

Extra commands are :

SPL	sets up a job to spool a file
JOBS	displays jobs running
RJOB	kills a job
SPJOB	sets job priority
AJOB	activates a job
WCOPY	selective copy with choice of yes/no/quit/all
STAT	displays sectors
WSTAT	file name/length/update date
WDIR	directory
WDEL	delete with choice as WCOPY
WDEL_F	delete files with selected extension
VIEW	display file
RENAME	renames a file
TRUNCATE	truncates a file
CLOCK	sets up a clock
DATA_USE	defaults for other commands
SPL_USE	defaults for SPL
RAM_USE	allows mdv to default to RAM disk
EXTRAS	list extra commands
FLEN	function to return filelength.
FTYP	function to return filetype

FDAT function to return data buffer length
FOPEN function to open a file and return the error
FOP_IN function to open a file and return the error
FOP_NEW function to open a file and return the error
FOP_OVER function to open a file and return the error
FOP_DIR function to open a file and return the error

The most interesting of the new commands is the RAM disk option, a RAM disk is set up with : `FORMAT ram1 200` the 200 being the number of sectors. Once set up the performance of a RAM disk as compared to Microdrives or disk is truly startling with save load times being very short:

Save 32k screen to mdv1 = 22 seconds
Save 32k screen to ram1 - = 1/2 second
Load 32k screen from mdv1 = 14 seconds
Load 32k screen from ram1 = 1/2 second

The RAM USE mdv command can make any RAM disk look like a Microdrive permitting existing software to run with no alteration. The use of RAM disks transforms the Quill program and I have written a special boot and machine code program for setting up Quill which is listed below. Once set up all file commands in Quill are to RAM2_ and are very quick indeed. At the end of a session you can save wanted documents to mdv2_ and return immediately to Quill if you want.

This product is a good alternative to disk drives and at the price represents excellent value. The only quibbles are the poor documentation (some of the commands are not even mentioned) and the lack of a through connector for further expansion.

PROGRAMS FOR USING QUILL WITH RAM DISKS :

Quill version 2.3 owners can use the CONFIG_BAS program to set up the device names as :

SYSTEM device mdv1_
DATA device ram2_
HELP device mdv1_

NEW BOOT PROGRAM FOR QUILL :

(delete lines 6,8 and 9 if you do not have these programs)

```
1 PRINT"setting up RAM disk for Quill"  
2 PRINT "ram1 ";  
3 FORMAT ram1 110  
4 PRINT "ram2 = "  
5 FORMAT ram2:200  
6 PRINT "EXEC-ing quill key and calc"  
7 PRINT "loading Quill into ram1_  
8 EXEC mdv1_quill_key
```

```
9 EXEC mdv1_calc
10 EXEC_W mdv1_quill to ram1
11 PRINT "choose doc files for ram2_\"
12 WCOPY mdv2 TO ram2_
13 EXEC_W ram1_quill
14 MODE 4
15 PRINT "copy wanted quill doc files to mdv2_\"
16 WCOPY ram2 TO mdv2
17 PRINT "GOTO 13 to re-start QUILL"
```

The Quill cartridge should remain in drive1 for help option and printing and the cartridge with _doc files should be in drive2

ASSEMBLY LISTING FOR "quill_to_ram1":

```
* routine to transfer "Quill" from mdv1_ to ram1_
* started 26-11-85
* use exec_w to activate (exec will not complete the transfer)

                SIZE      256                256 byte buffer
* standard QDOS entry format
START          BRA.S      SET_PRIORITY      skip standard
                DC.L      0                  QDOS
                DC.W      $4AFB              entry
                DC.W      6                  chars in job name
                DC.B      Q_ram1             job name

* set priority from 1 (lowest) to 127 (highest)
SET_PRIORITY   MOVEQ      #$0B,D00           (MT PRIOR)
                MOVEQ      #-1,D1            this job
                MOVEQ      #127,D2           highest priority
                TRAP       #1                set priority

* open Quill file
OPEN_FILE_IN   LEA        FROM_NAME,A0
                MOVEQ      #1,D0             (IO OPEN)
                MOVEQ      #-1,D1            this job
                MOVEQ      #1,D3            old shared file
                TRAP       #2
                TST.L      D0                error ?
                BEQ.S      STORE_ID
                BRA        ERROR_EXIT
STORE_ID       LEA        CHANNEL_STORE,A4
                MOVE.L     A0,(A4)           store channel ID

*get Quill header for filelength and buffer size
GET_HEADER     LEA        BUFFER,A1
                MOVEQ      #$47,D0           (FS_HEADR)
                MOVEQ      #14,02           buffer length
                MOVEQ      #-1,D3           timeout
                TRAP       #3
                TST.L      D0                error ?
                BEQ.S      GOT_HEADER
                BRA        ERROR_EXIT
```

```

* get room to load in Quill
GOT_HEADER    LEA    BUFFER,A1
              MOVE.L (A1),D1
              MOVEQ  £$18,D0
GET_ROOM      MOVEQ  £-1,D2
              TRAP   £1
              TST.L  D0
              BEQ.S  GOT_ROOM
              BRA    ERROR_EXIT
GOT_ROOM      LEA    ROOM_STORE,A4
              MOVE.L A0,(A4)

* load in Quill file
              MOVE.L A0,A1
              MOVEQ  £-1,D3
              MOVE.L CHANNEL_STORE,A0
              MOVEQ  £$48,D0
              LEA    BUFFER,A5
              MOVE.L (A5),D2
              TRAP   £3
              TST.L  D0
              BEQ.S  GOT_LOAD
              BRA    ERROR_EXIT

* load complete so close channel
GOT_LOAD      MOVEQ  £2,D0
              TRAP   £2

* open ram1 for saving Quill to
SAVE_START    LEA    TO_NAME,A0
              MOVEQ  £1,D0
              MOVEQ  £-1,D1
              MOVEQ  £2,D3
              TRAP   £2
              TST.L  D0
              BEQ.S  GOT_OPEN_OUT
              BRA    ERROR_EXIT

* save Quill to ram1
GOT_OPEN_OUT  LEA    CHANNEL_STORE,A4
              MOVE.L A0,(A4)
              MOVEQ  £$49,D0
              LEA    BUFFER,A5
              MOVE.L (A5),D2
              MOVEQ  £-1,D3
              MOVE.L ROOM_STORE,A1
              TRAP   £3
              TST.L  D0
              BEQ.S  SAVE_OK
              BRA    ERROR_EXIT

* set header in order to put in exec type file and buffer length
SAVE_OK       LEA    BUFFER,A1
              MOVEQ  £$46,D0
              TRAP   £3

```

file length to D1
(MT ALCHP)
this job

error ?

store room base

base for load
timeout
get channel ID
(FS_LOAD)

file length

error ?

IO_CLOSE

(IO_OPEN
this job
new exclusive file

error ?

store £ID
(FS_SAVE)

length of file to save

base of file

error ?

base of header block
(FS HEADS)

	TST.L	D0	error ?
	BEQ.S	HEADER_SET_OK	
	BRA	ERROR_EXIT	
* close channel and release memory used			
HEADER_SET_OK	MOVEQ	£2,D0	(IO CLOSE)
	TRAP	£2	close in channel
RELEASE	MOVE.L	ROOM_STORE,A0	
	MOVEQ	£\$19,D0	(MT_RECHP)
	TRAP	£1	
WAIT	TST.B	\$280EE	microdrive still running ?
	BNE.S	WAIT	
	BRA.S	ZAP_JOB	skip error
* print error message and kill job			
ERROR_EXIT	MOVE.L	£\$00010001,A0	get con_£ID
	MOVE.W	\$CC,A2	(UT_ERR)
	JSR	(A2)	print error message
ZAP_JOB	MOVEQ	£-1,D1	this job
	MOVEQ	£5,D0	(MT_FRJOB)
	MOVEQ	£0,D3	error code
	TRAP	£1	kill job
FROM_NAME	DC.W	10	number of chars in name
	DC.B	'mdv1_quill'	filename
TO_NAME	DC.W	10	number of chars in name
	DC.B	'ram1_quill'	filename
ROOM_STORE	DS.L	1	storage for room
CHANNEL_STORE	DS.L	1	storage for channel ID
BUFFER	DS.B	14	buffer for file header
	END		

BASIC PROGRAM TO MAKE THE EXEC FILE "quill_to_ram1"

```

1 REMark *****
2 REMark * make code for quill_to_ram1 *
3 REMark *****
4 RESTORE 14
5 start=RESPR(1024):checksum=0
6 FOR f=start TO start+279
7 READ byte:POKE f,byte
8 checksum=checksum+byte
9 NEXT f
10 IF checksum<>21753:PRINT"error in data":STOP
11 DELETE mdv1_quill_to_ram1
12 SEXEC mdv1_quill_to_ram1,start,280,256
13 PRINT "quill_to_ram1 saved ok":STOP
14 DATA 96,14,0,0,0,0,74,251,0,6
15 DATA 81,95,114,97,109,49,112,11,114,255
16 DATA 116,127,78,65,65,250,0,208,112,1
17 DATA 114,255,118,1,78,66,74,128,103,4
18 DATA 96,0,0,172,73,250,0,216,40,136
19 DATA 67,250,0,214,112,71,116,14,118,255
20 DATA 78,67,74,128,103,4,96,0,0,146
21 DATA 67,250,0,194,34,17,112,24,116,255

```


22 DATA 78,65,74,128,103,4,96,0,0,126
23 DATA 73,250,0,186,40,136,34,72,118,255
24 DATA 32,122,0,160,112,72,75,250,0,158
25 DATA 36,21,78,67,74,128,103,4,96,0
26 DATA 0,94,112,2,78,66,65,250,0,118
27 DATA 112,1,114,255,118,2,78,66,74,128
28 DATA 103,4,96,0,0,70,73,250,0,114
29 DATA 40,136,112,73,75,250,0,110,36,21
30 DATA 118,255,34,122,0,94,78,67,74,128
31 DATA 103,4,96,0,0,40,67,250,0,88
32 DATA 112,70,78,67,74,128,103,4,96,0
33 DATA 0,24,112,2,78,66,32,122,0,60
34 DATA 112,25,78,65,74,57,0,2,128,238
35 DATA 102,248,96,12,32,124,0,1,0,1
36 DATA 52,120,0,204,78,146,114,255,112,5
37 DATA 118,0,78,65,0,10,109,100,118,49
38 DATA 95,113,117,105,108,108,0,10,114,97
39 DATA 109,49,95,113,117,105,108,108,0,0
40 DATA 0,0,0,0,0,0,0,0,0,0
41 DATA 0,0,0,0,0,0,0,0,0,0

Barry Ashfield
37 Cottesmore Road,
Hassle,
North Humberside. HU13 9JQ.
Tel: (0482) 649187

FOR SALE

Philips TP200 mono monitor. As new condition.	£40 o. n. o.
Epson RS-232 internal interface.	£20 o. n. o.
BBC Centronics cable.	£ 7
QL RS-232 cable.	£ 7
Sinclair project planner.	£19 o. n. o.
Psion finance pack (for Organiser) cost £31.	£15
Microdrives (20)	£25

Kable S. Singh,.
39 Broad Chalke Down,
Winchester SO22 4LR.
Tel: (0962) 65184 Prestel MBX 096265184

FOR SALE

TEAC full height uncased 40 track double sided/double density disk drives suitable for QL
£50.00 each.

S. Day,
241, Highfield Road,
Romford, RM5 3AW.

DIY EXTRA MEMORY PROBLEMS

I have successfully built and added an extra 128K of RAH to my QL and in doing so
encountered a problem with the decoding which I will describe for the benefit of others.

On an unexpanded QL the memory map of the area usable for memory expansion is shown in Figure 1. As can be seen the 256K area occupied by the unexpanded QL is imaged to the two 256K blocks above the basic machine's addresses due to decoding deficiencies in the QL.

On power-up the QL loads data to the first byte of each 64K block above \$40000 and then checks by doing a read from the same location to see whether valid RAM exists. When it tries first to write and then read from locations \$40000, as an image of ROM exists there no valid return is obtained and the QL sets itself up to test the 128K of internal RAM. It then does the test by copying its ROM to RAM and reads it back to check for errors by comparing the values read to those in ROM. It's not quite as simple as that really but that's the general idea.

If a 256K memory expansion is fitted then at power up the QL will get a valid return from each 64K block up to \$7FFFF and an invalid return from the ROM image at \$80000. Following this invalid return it will set up to test that amount of RAM over its internal 128K. Similarly if 512K is added, it will get valid returns up to \$BFFFF and will test that amount of RAM.

The problems start if 128K or 384K blocks of expansion RAM have been added. Say 128K is added; when the QL tests for RAM it gets its valid returns from the 64K blocks up to \$5FFFF as it should. It then looks at location \$60000. It should NOT get a valid return from this location but as can be seen from the memory map, imaged RAM from its own 128K appears there (area x on the diagram). In consequence of the imaged RAM at \$60000 a valid return is obtained when the QL writes there and does the following read. This means the QL has been fooled into thinking there is more RAM than our added 128K. It then tries to test this area of RAM by loading it with data from ROM. In doing so it overwrites data required by the test program which is using part of the internal 128K and thinks it has faulty memory in this block. The same conditions apply if 384K has been added.

The indication the QL gives of this failure of the test to complete is a green or white screen which is the normal result of finding faulty RAM.

To overcome the problem is fairly simple once the penny has dropped. What we need to do is to decode the imaged RAM area immediately above our added 128K or 384K so that when the system writes there and then does a read it sees simply space instead of imaged RAM. The system however needs an acknowledge signal from all areas of RAM in its map or it will hang up. This acknowledge signal must be provided. The decoding used for additional devices and memory has to pull the DSMCL line on the interface high to disable internal decoding and thus eliminate the image of its internal RAM. You will have provided this in the normal decoding, probably via a fast transistor however if 128K or 384K is being added you will need to pull this line high for the next block also.

The acknowledge line will also need to be pulled low on every memory access to this area as mentioned above. This can be done from the same line but must be combined with the write signal (see below). An example of suitable decoding for 128k is shown in Figure 2.

Another point which may catch people out is that any additional memory must be able to respond to the 68000/68008 r-m-w (read-modify-write) cycle. This instruction is used in the power-up test (and elsewhere of course) and must be able to be handled by any memory added. If your memory cannot do this read-modify-write you will get a RAM failure screen (green or white).

When the 68008 does a r-m-w cycle it only generates one address strobe which lasts the full r-m-w cycle. This means that column address strobe (CAS) will not normally be raised and lowered again for the final write of the cycle and the RAM internal buffers will still be in a read state when the write occurs. To overcome the problem CAS must be gated by the data strobe line as this line is lifted and lowered again on the write part of the r-m-w cycle. This strobe of the CAS line combined with the R/W line going low turns off the read buffers and turns on the write buffers inside the RAM chips.

A separate acknowledge must also be generated for the read and the write part of the r-m-w cycle. This is done by gating in the R/W line.

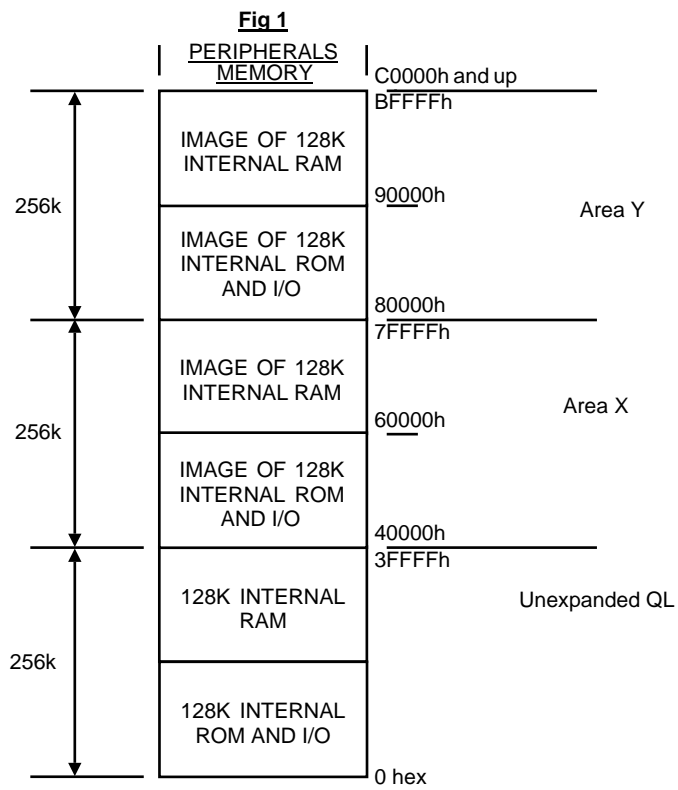
If a TMS4500 is used to provide the refresh to the expansion RAM you may also find the power up reset time of some QLs a bit borderline for initialising the TMS4500. It is on mine and once in about 10 power ups the reset button must be pressed after powering up to clear the screen. This can be cured by increasing the reset time constant with a few extra microfarads. It is not enough of a problem on mine but a friend's needed it.

I hope this information may be of help and will encourage more DIY.

Just for the record, my expansion memory was hand wired on Vero type board. Getting it running was no problem once the decoding snag was discovered. The design was pretty basic stuff. The TMS4500 data sheets and manual (obtainable from Texas Instruments) virtually does it for you. There's a 68000 interface in there. A circuit was published in Elektor recently, but this has a number of errors and suffers from the decoding problem referred to above. (They couldn't have tried it!).

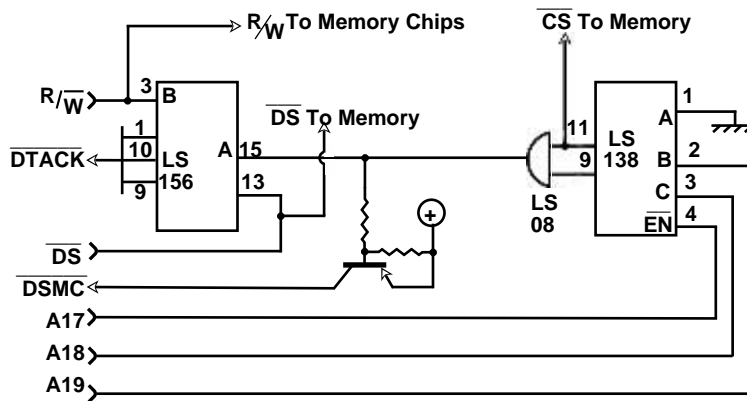
My board sits on top of the QL (where the keyboard was!) and is wired directly to the DIN expansion socket with very short wires. The expansion socket is needed for the CST disk interface. An extended Hall-effect keyboard has been in use for some time now. It has additional keys such as an underscore without shift and a full hex maths keypad but that's another story...

Roy Barber,
44 Dallin Road,
Bexleyheath,
Kent. DA6 8EJ.
Tel: 01-304 3856



UNEXPANDED QL MEMORY MAP

FIG 2.



128K Memory Expansion decoding

FOR SALE

I have a number of top-quality Sony 3.5" disks which members might be interested in buying at £2.70 each (just over half-price), P and P free.

They are single-sided double density, unformatted, and will format OK single- or double-sided (replaced post-free otherwise).

It may help members who can't afford to lash out £45 when they only want one or two disks.

Denis Yardley,
48 Park Road,
Chandler's Ford,
Eastleigh,
Hants.

TANDATA Q-CONNECT SOFTWARE FIX

The software supplied with the Tandata Q-Connect was originally designed to run with a standard QL with 128K RAM. If you have a QL with expanded memory e.g. 512K, you will have to modify the software as follows:-

1. Place the Q-Connect cartridge in mdv1 and type "DELETE mdv1_b2"
2. Type in the following SuperBASIC program:

```
10 CSIZE £0,2,0:INK £0,7:AT £0,0,2:PRINT £0,"Loading Qconnect -  
Version 2.0...":CLEAR:a=179792:  
EXEC mdv1_clk:LBYTES mdv1_Qconnect,a:CLOSE £1:CLOSE £0: CALL a
```

3. Save this program by typing "SAVE mdv1_b2"
4. Copy the software as normal using Qclone. A copy of software should be used at all times, and the master stored safely, particularly when using the modified version of the software.

Prolonged use of the program, particularly if other programs are being run concurrently, may lead to a crash. It will then be necessary to reset the QL and reload.

This mod. works by forcing the program into an area of memory not normally allowed, rather than merely reserving space for it. Hence, the operating system does not know that a program is in memory and is liable to use the space for its own purposes and may, in some circumstances, cause a crash. Tests have shown that it is possible for such a crash to corrupt a cartridge resident in a drive at the time, so it is important not to use the original cartridge. This patch is not compatible with the CST Qdisk.

The mod. is intended to be only a temporary measure to allow some use of the equipment, pending further development work on the software. We have commissioned a change to the software that will allow it to run with expanded memory versions without this problem. If you would like a copy of this program when ready, please write to me.

James Adams,
Customer Liaison,
Tandata Marketing Ltd.,
Albert Road North,
Malvern,
Worcs. WR14 2TL.

QL USER CLUB - SCHWEIZ

Bern now has a QL Club, founded in August 1985. Please contact:-
QL User Club - Schweiz,
Haselholzweg 12,
CH-3098 Schliern,
Switzerland.

Translate Options

I am grateful to both David Nowotnik (July 85) and David Howard (October 1985) for the translate options suggested for the printer driver. I have a Canon 1080A printer (Epson compatible) and have adapted their methods for my options. Some members may also find them useful. When the printer range is expanded as described below, CTRL SHIFT 1 etc. are used for keying, and hence, I have used CTRL SHIFT A, CTRL SHIFT B, designated below as <CS>A, <CS>B, etc. instead. <C> denotes CTRL only. The non-printing characters generated by <CS>A etc., after a period of use, will be recognised for the functions they represent.

Printer Driver: Standard double strike.(27,64,27,33,16,27,82,0)

A useful combination of the ten translate options

1 £ sign	£ 27,82,3,#,27,82;0
2 Enlarged characters. & proportional spacing.	("Copyright sign) or 127, 27,112,1,14, "<SPACE>. Auto-cancelling for enlarged on line feed. Initiates proportional spacing on normal type after depressing <ENTER>. (With enlarged, take care of margins!!)
3 <i>Italics</i>	"<CS>A(i.e. Control,Shift,A),27,52,"<SPACE>
4 Cancel italics	"<CS>B,27,53,"<SPACE>
5 Expand range	"<CS>C,27,54,"<SPACE>
6 Cancel above	"<CS>D,27,55,"<SPACE>
7 1/8 in. Spacing	"<CS>E,27,48,"<SPACE>
8 Cancel above	"<CS>F,27,50,"<SPACE>
9 Condensed double strike	"<CS>G,27,33,1,"<SPACE>
10 To cancel above & prop.spacing	"<CS>H,27,112,0,27,33,16,27,82,0,"<SPACE>

(1 - If proportional spacing is not available leave out 27,112,1 and from translate 10 - 27,112,0).

Notes on options

1. Where £ is seldom used, as it is available by typing in <CS>C, <CS>7, translate 1 can be saved for another option. Once this option has been initiated, the Spanish pts may be printed out by using <C>;, likewise ¥ for the Japanese Yen using <CS>/, and ° for 25°C. or 45° (angles) using <CS>5. It should be noted that, in these cases, the characters appearing on the screen are different from those printed out.
2. When using English text, use in the same document of any of the available international set of characters may be installed, choosing the appropriate numbers, e.g. 1 for French, by using, say, "<CS>G,27,82,1,"<SPACE>. Cancel by using <CS>H.
3. Where near letter quality (NLQ) printers are used there may be room for an easy plug-in of a single NLQ ROM on the board carrying the dip switches. <CS>A and <CS>B may be used respectively for the initiation and cancelling. For the Canon printer (and the Kaga) a choice is available from NLQ italics to several others including the Greek set of characters. In the Greek set, using <CS>C, various mathematical symbols may be printed out instead of those shown below#. Other NLQ printers may also have similar ROM options.

Operation

Function	Type in	Examples and remarks
1. Pound	£	£
2. Enlarged	©	ENLARGED & Prop'l Enlarged is self cancelling after a line feed. Proportional spacing (always in the emphasised mode) is also set after depressing >ENTER To cancel proportional spacing depress <CS>H.
3. <i>Italics</i>	<CS>A	<i>This is in italics.</i>
4. Normal	<CS>B	This is returned to normal.
5. Expand range*	<CS>C	Type <C>0, <C>2, <C>3, <CS>7,# For § Æ æ £
6. Cancel above	<CS>D	
7. 1/8 in spacing	<CS>E	The following will be in 1/8 in. Spacing, so as to get more lines per page - Type <F3>, D, P, 78.
8. Cancel above	<CS>F	The next set of lines will be returned to 1/6 in. Spacing.
9. Condensed double strike	<CS>G	Cancel by using <CS>H.
10. Cancel above	<CS>H	This also cancels proportional spacing & language character sets- (See note 2 above on options.)

* The printable range is expanded to include characters represented by decimal codes 128 (hex 80) to 159 (hex 9F) and 255(hex FF). The decimal codes the keying used and the respective characters printed out are given below. The keying given in Concepts - QL Users Guide - does not seem to work for decimal codes 128 and 255.

#									
128,		129, <CS>1	ã	130, <CS>'	â	131, <C>3	é		
132, <CS>4	ö	133, <CS>5	õ	134, <CS>7	ç	135, <C>'	ü		
136, <CS>9	å	137, <CS>0	ñ	138, <CS>8	œ	139, <CS>=	¿		
140, <C>,	á	141, <C>-	à	142, <C>.	Ä	143, <C>/	ë		
144, <C>0	è	145, <C>1	ê	146, <C>2	ï	147, <C>3	í		
148, <C>4	ì	149, <C>5	î	150, <C>6	ó	151, <C>7	ò		
152, <C>8	ô	153, <C>9	ú	154, <CS>:	ù	155, <C>;	û		
156, <CS>,	ß	157, <C>=	ø	158, <CS>.	ÿ	159, <CS>/	`		

K. Arianayagam
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